

VISUAL RESOURCES RESPONSES

Request #135 - Please provide three sets of electronic files on CDs of the following figures or their revisions: 3.2-1, 3.3-1, 3.3-2, 3.4-1, 3.4-2, 3.4-3, and all figures contained in the Visual Resources Section of the AFC.

Response #135 - Three CD's are enclosed which contain electronic copies of the above listed files. These CD's are delineated as 135-1, 135-2, and 135-3. Please note the following comments.

Figures 3.2-1, 3.3-1, 3.3-2 and 3.4-3 have not been revised. Figures 3.4-1 and 3.4-2 were not available in electronic format and are supplied in hard copy form at Response #141. Figure 3.3-2 is also not available in electronic format. As such six (6) copies of this figure are provided in hardcopy format. All hardcopy figures are supplied in the attached visual packet.

Request #136 - Please provide three sets of electronic files on CDs of the revisions to existing figures and new figures as requested in the following Data Requests.

Response #136 - Presently there are no revisions to existing figures in the visual resources section. New figures as requested in following data requests will be supplied by March 13, 2002. These CD's are delineated as 136-1, 136-2, and 136-3.

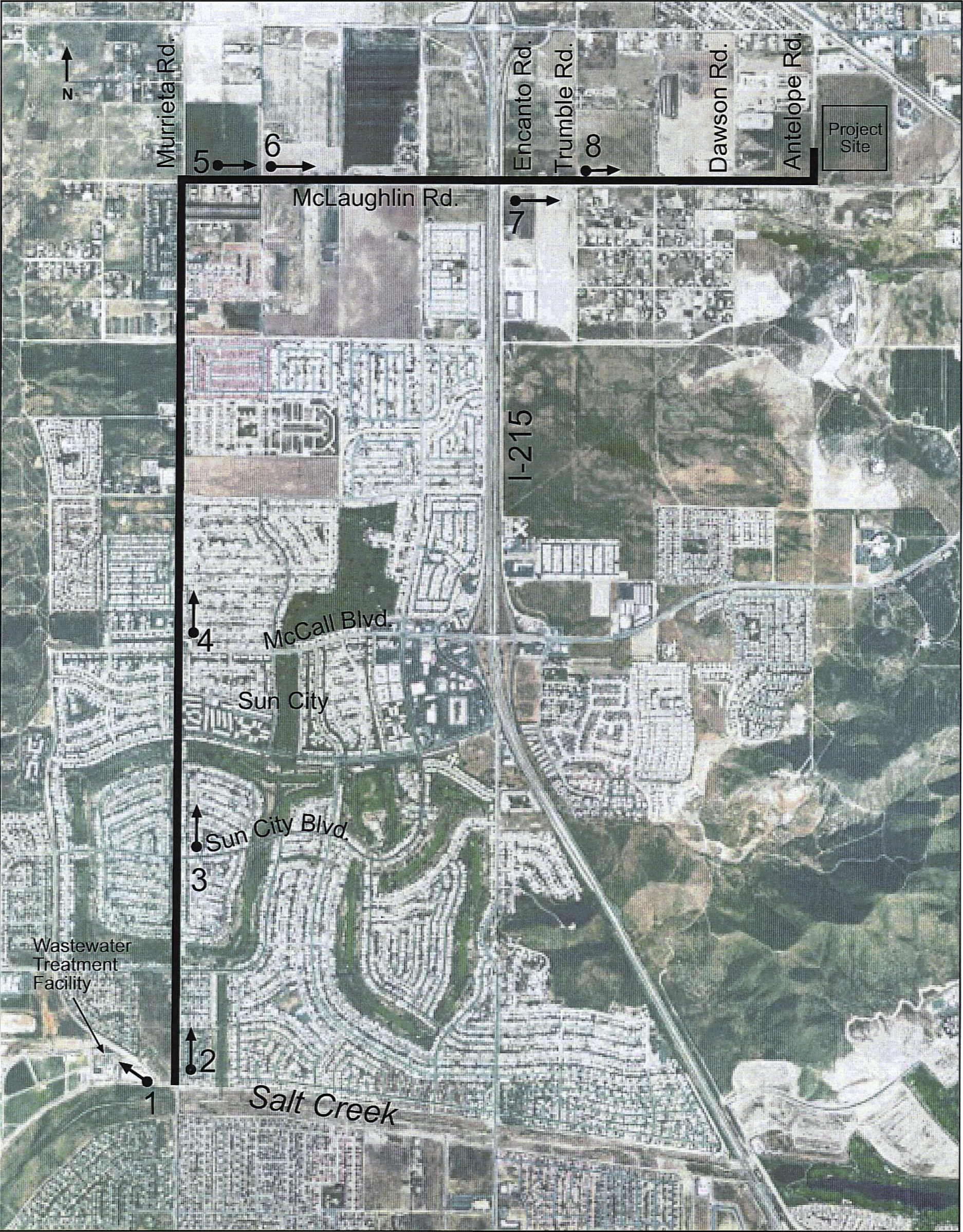
Request #137 - Please provide existing setting photographs of the alternative gas pipeline route and the wastewater pipeline route. Each linear facility should have a sufficient number of photographs to fully characterize the different landscapes crossed by the pipeline rights of way.

Response #137 - The alternative gas pipeline route has been eliminated from consideration, so this route no longer requires environmental evaluation. As a consequence, the responses to this Data Request and to Data Requests 138 and 139 will be restricted to issues associated with the proposed wastewater pipeline.

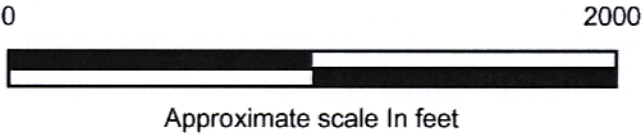
Construction of the wastewater pipeline will start at the Sun City Regional Water Reclamation Facility (RWRF) and will proceed north and then east toward the project site. The presentation of the pipeline route photographs and the description of the route has been structured to reflect the direction of this construction path. Figure DR 137-1 indicates the location of the non-reclaimable wastewater pipeline route and the locations at which the photographs were taken that are being submitted to illustrate the landscape conditions along the route. Because this figure was prepared using an air photo taken in March 2001 as its base, it also provides an idea of the street and development patterns along the pipeline's route.

Photo DR 137-1 is a view of the Sun City RWRF where the non-reclaimable wastewater line serving the IEEC will begin. The Sun City RWRF is located on the north side of the Salt Creek Channel and is set back approximately 1,000 feet from Murrieta Road. A paved road providing access to the wastewater facility passes through the setback area, and a portion of the setback is a fenced area used for agricultural education by a local high school. The rest of the setback area consists of bare, undeveloped land.

Starting in the area in front of the wastewater treatment facility, the pipeline will extend northward for 2.6 miles, following an alignment under Murrieta Road. For most of this distance, the pipeline route passes through the unincorporated community of Sun City.



16R267 TM 01+Sun City Wastewater Pipeline/2/6/2009/SCN



- Pipeline route
- Photo locations

Figure DR 137-1
Proposed Wastewater Pipeline
Visual Context

Photo DR 137-2 is a view looking north along Murrieta Road in the area in front of the wastewater treatment facility. The vacant setback area in front of the wastewater treatment plant is visible on the west (left) side of the street. The vegetation on the right side of the street is a hedge along the edge of the Rancho del Sol residential community, where because the homes front on interior streets, there are no homes fronting on Murietta Road.

Photo DR 137-3 is a view looking north along Murrieta Road at Sun City Drive. This view is typical of conditions along a 1.6 mile section of Murrieta Road in the central portion of Sun City, where in many areas, single family homes front on both sides of the street.

Photo DR 137-4 is a view looking north along Murrieta Road in the area just north of McCall Boulevard. In this area, the residential developments on both sides of the road are oriented to internal street systems, so no homes front on Murrieta Road. As this photo indicates, the residential areas are buffered from Murrieta Road either by walls, or by a combination of walls and landscaping. This pattern prevails along the 1.35 mile segment of Murrieta Road between McCall Boulevard and McLaughlin Road. In this area, there is a mixture of open, undeveloped lands and areas developed with residential communities that are oriented to internal street networks and are buffered from Murietta Road by setbacks, landscaping, and walls.

Photo DR 137-5 is a view looking east on McLaughlin Road, immediately east of Murrieta Road. In this area, the pipeline right of way lies under an unpaved segment of McLaughlin Road. The pipeline route passes by a one block area of low density rural residential development, and then extends approximately 0.65 mile eastward through an area of open agricultural land before reaching Interstate 215. The area on the north side of the road is occupied by an electric transmission corridor that now accommodates a 115 and a 500 kV line. In this view, Interstate 215 is visible as the white line that defines the far end of the open fields visible in the middleground.

Photo DR 137-6 is a view looking east on McLaughlin Road, from a viewpoint immediately to the east of the rural residential area visible in Photo 5. In this view, the open agricultural lands on both sides of McLaughlin Road can be seen. In addition, this photo provides an unobstructed view of the agricultural/infrastructure character of the lands alongside Interstate 215 in the area where the pipeline right of way crosses under the freeway.

Photo DR 137-7 is a view looking east on McLaughlin Road from its intersection with Encanto Drive, which lies immediately to the east of Interstate 215. McLaughlin Road is paved for approximately one block in this area before reverting to an unpaved track. As this photograph suggests, the area to the south of McLaughlin Road is now being developed as a residential area. The homes that have been developed to date do not front on McLaughlin Road, but rather are buffered from it by walls along their back lot lines. The area to the north side of the road is occupied by the electric transmission corridor that now accommodates a 115 and a 500 kV line. North of the transmission corridor, the land remains in agricultural use.

Photo DR 137-8 is a view looking east along McLaughlin Road from its intersection with Trumble Road. This view is typical of the conditions that exist for the approximately 0.8 mile segment of the right of way that extends from Trumble Road to the project site. In this area, McLaughlin Road is unpaved, and is bordered by the 115/500 kV transmission corridor on the north. For the most part, the land on the north side of the road consists of open parcels in agricultural use; the exception is at the intersection of Dawson Road, where there is a cluster



Photo DR 137-1. View looking west toward wastewater treatment plant. Agricultural education area is visible at right.



Photo DR 137-2. View looking north along Murrieta Road. Setback area in front of wastewater treatment plant is visible on left. Hedge on right side of street screens back lot lines of homes in Rancho del Sol residential community.



Photo DR 137-3. View looking north along Murrieta Road at Sun City Drive.



Photo DR 137-4. View looking north along Murrieta Road just north of McCall Boulevard. Note landscaping and walls buffering back lot lines of residential communities oriented to internal street systems.



Photo DR 137-5. View looking east on McLaughlin Road, immediately east of Murrieta Road. On the north side of the road is an electric transmission corridor accommodating a 115 and a 500 kV line.



Photo DR 137-6. View looking east on McLaughlin Road, immediately east of the rural residential area. Interstate 215 is visible as the horizontal line at the far end of the area of open fields visible in the foreground and middleground.



Photo DR 137-7. View looking east on McLaughlin Road at the intersection of Encanto Drive, immediately east of Interstate 215.



Photo DR 137-8. View looking east on McLaughlin Road at the intersection of Trumble Road.

of rural residences that front on Dawson Road north of the transmission corridor. On the south side of McLaughlin Road, there are several areas where large rural residential parcels back up to the road.

The portion of the wastewater line route with the greatest potential sensitivity to the construction period impacts is the area depicted in Photo 3, the 1.6 mile section of Murietta Road in the central portion of Sun City, where in many areas, single family homes front on both sides of the street. Because of the orientation of the homes to the street, the relatively small setbacks, and the limited amount of screening vegetation in the front yards, the construction activities will be highly visible to the residents in this area. However, because of the very short length of time that the construction activity will be evident along any specific segment of the route in this area, the overall visual impact will not be significant.

The only recreational facilities located in proximity to the pipeline route are the golf courses around which Sun City's residential streets have been developed. Although the portion of the pipeline route along Murrieta Road that passes through the central area of Sun City passes by two narrow segments of the golf courses, the pipeline construction will not be highly visible from the golf courses and will thus have little effect on the visual experiences of the golf course users.

In the areas along Murrieta Road at the southern and northern ends of Sun City represented by Photos DR 137-2 and DR 137-4, the sensitivity to potential visual impacts of pipeline construction is low because there are few or no residences that look directly onto the street where the pipeline construction will take place.

In the portion of the pipeline route that lies in McLaughlin Road in the area between Murrieta Road and the power plant site (Photos DR 137-5, -6, and -8), the sensitivity to pipeline construction visual impacts is particularly low. In these areas, the unpaved roadway already has a disturbed appearance. To the extent to which there are rural residences in the vicinity of this portion of the route views toward the pipeline right of way are buffered by distance, and in some cases, by the presence of screening vegetation. In the area along McLaughlin Road near Encanto Drive where there is a standard subdivision (Photo DR 137-7) the visual sensitivity is low because none of the homes front onto McLaughlin Road.

Interstate 215, under which the pipeline will pass is a visually sensitive area in that this freeway has been designated as Scenic Road Corridor in the Riverside County Plan. The visual impacts of pipeline's construction on this road corridor will be limited and less than significant because of the brief period of time during which the construction activities will be visible. In addition, even when they are visible, the construction activities will be of a scale and character that will not significantly alter the character and quality of the landscape now seen from this segment of the freeway, in which infrastructure facilities and projects under construction are already prominent features in the view.

Request #138 - For a typical pipeline spread (and note any differences between gas and wastewater pipelines), please describe the construction equipment to be used, the length of a typical spread, and the amount of time a typical spread would be visible at any one location along the routes.

Response #138 - For most of its route, the non-reclaimable wastewater pipeline will be buried within the rights of ways of public roads. In these areas, construction will entail open

cut trench excavation. In the area where the pipeline will cross under Interstate 215, boring and jacking operations will be required.

The Contractor will be limited to 500-feet of open trench at anytime in accordance with County of Riverside Transportation Department Encroachment Permit Requirements. Typically from 250-300 feet of pipeline will be installed daily as the project proceeds along the stipulated alignment. All work will be confined to the Public right of way.

Typical open cut trench excavation will utilize a backhoe/excavator to dig the trench which will be set over the trench as it moves down the alignment. The excavated material will be placed next to the trench temporarily. The pipeline will be placed in the trench from a crane where it will be bedded and backfilled with the excavated material pushed in the trench from a loader. After backfill, the trench will be compacted. Paving will be placed over the top of the trench and rolled for compaction. After completion of a half-mile or so, the trench will be capped with a 12-foot wide section of asphalt concrete to provide a smooth travel lane.

All excavations will be protected by various shoring, sheeting and bracing as required for safety and in the manner set forth in the rules, orders and regulations prescribed by the Division of Industrial Safety of the State of California. All trenches and excavations will be backfilled overnight and on weekend and holidays. For the bore pits required for the jacking operations entailed in installing the pipeline under the freeway, barriers shall be placed around the excavations, from sunset each day to sunrise of the next day until such excavation is entirely refilled after jacking operations. The sewer line will be installed within a casing, after the casing is bored and jacked across the freeway at a rate of 20 to 40 feet per day.

It is not likely that equipment storage and laydown areas will be established as a part of this construction project. Consistent with the practices for other pipeline construction projects in this area, the pipe will be strung or stockpiled in the parkway along the right-of-way. The stored pipe will be present for a limited period of time and will be placed in a manner that will not limit access to adjacent properties. The construction equipment will be removed from the pipeline route at the end of each work day, and returned to the contractor's equipment yard. Should a determination be made that a laydown and storage area should be needed for this pipeline construction project, it is most likely that it would be located adjacent to the SCE transmission line right of way along McLaughlin Road, just west of I-215. If a laydown and storage area be required, it would be surrounded by a fence, and if required by the County or the CEC, screening could be provided by means of horizontal slats placed in the fence or by hanging a screening fabric on the fence.

The construction of the entire pipeline will take place within a period of approximately four months. Along any area of the pipeline where active construction is taking place, trenching and installation of piping can be expected to be completed within a week, and final repaving of the street can be expected to be completed within a month.

Request #139 - Please identify any potentially sensitive viewing locations along the pipeline routes including residences, recreational areas or facilities, and scenic highways.

Response #139 - This information is included in Response #137.

Request #140 - Please identify the height of the tallest asphalt plant structures.

Response #140 - The tallest structure at the existing asphalt batch plant, which is owned and operated by Vulcan Materials (AQMD Facility ID#128319), is the feed silo at 75.2 ft. above

ground level. This data was developed by actual field measurements (elevation shots) on 1-24-02 by Webb and Associates, Riverside, CA.

Request #141 - Please revise Figures 3.4-1 and 3.4-2 to identify structures and specify their heights.

Response #141 - Figures 3.4-1 and 3.4-2 have been revised to identify the primary site structures and heights above ground level. These revised figures are numbered 141-1 and 141-2. (See following pages.)

Request #142 - Please re-scale all setting and simulation images to achieve life-size scale. If re-scaling results in substantial degradation of the image, please provide new high resolution setting and simulation images at life-size scale. After obtaining appropriately scaled images, please provide six photocopies of high quality 11"x17" color images of the existing views and simulations.

Response #142 - The requested copies of the re-scaled visual simulations are included in the attached visual resources packet.

Request #143 - For each KOP, please provide photocopies of high-resolution 11"x17" color images of life-size scale simulations of the screening vegetation at five years of growth.

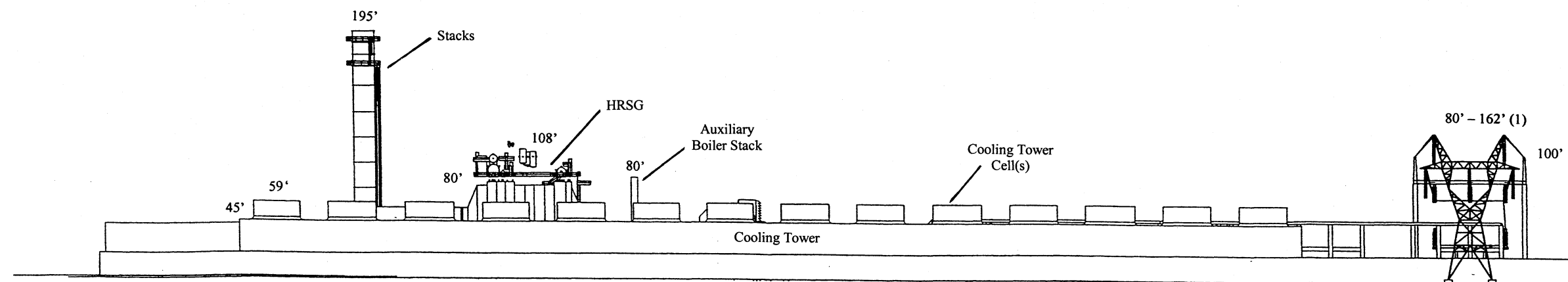
Response #143 - An objection to this request has been filed with the CEC.

Request #144 - Please describe existing visible night lighting at the project site and in the immediate project vicinity.

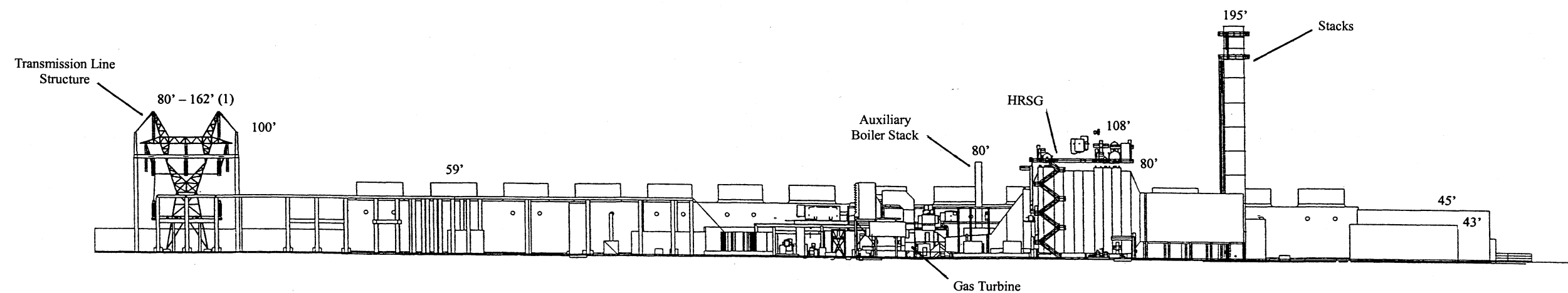
Response #144 - At present, there are no structures and no lights located on the project site. However, the site is illuminated to a small degree by the moderate level of ambient lighting created by light from nearby sources. For example, several large spotlights are mounted on the new concrete batch structure at the construction materials facility located immediately north of the project site. These spotlights illuminate both the tall structure and the surrounding ground area. In views toward the project site from the south, a line of lights can be seen in the corridor that runs along State Route 74. In addition, a number of the industrial facilities that lie to the northeast of the site have a moderately high level of exterior illumination that makes the walls of these buildings appear to glow in distant views.

Request #145 - Please describe the extent to which night lighting during project operation would be visible from each KOP. Also, please describe the visibility of project components (including exhaust stacks and vapor plumes) due to illumination from: a) existing ambient lighting and b) the combination of existing ambient lighting and proposed project lighting.

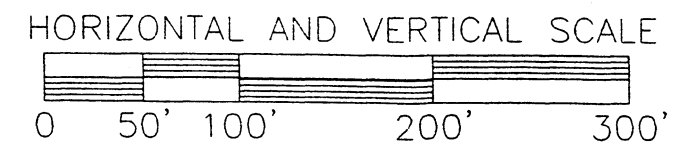
Response #145 - To establish a basis for making a determination of the extent to which project-related night lighting would be visible from each KOP during project operation, a review was made of photographs that were taken in the summer of 2001 to document the nighttime appearance of the Sutter Energy Center. The Sutter Energy Center in Sutter County is a recently built combined cycle power plant that is similar in many ways to the proposed project and it conforms to the CEC's current standards for the mitigation of power plant nighttime lighting effects. Photographs of the Sutter project that were carefully shot and printed to capture the actual nighttime appearance of the facility were filed with the California Energy Commission by East Altamont Energy Center, LLC on October 5, 2001 as



VIEW LOOKING NORTH



VIEW LOOKING SOUTH

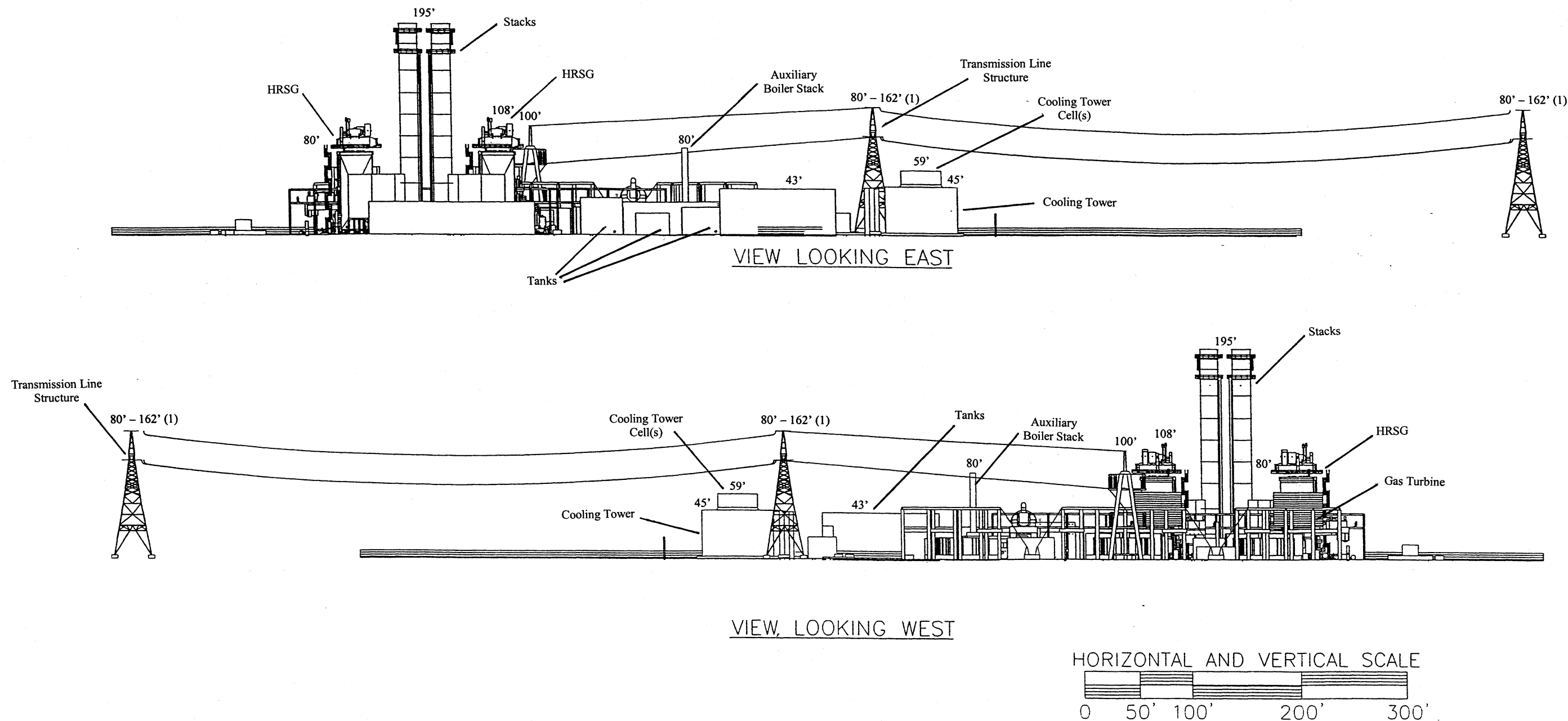


(1) The structure heights above grade range from 80 to 162 feet depending on tower spacing, and acceptable physical separation of conductors from the underlying roads, railroads, and transmission lines.

Inland Empire Energy Center, LLC
Inland Empire Energy Center

Figure 141-1

Elevations- Views Towards North and South



(1) The structure heights above grade range from 80 to 162 feet depending on tower spacing, and acceptable physical separation of conductors from the underlying roads, railroads, and transmission lines.

Inland Empire Energy Center, LLC
Inland Empire Energy Center

Figure 141-2

Elevations- Views Towards East and West

Data Requests and Responses (01-AFC-4) Set #1A as a part of the licensing procedures for the East Altamont Energy Center.

Review of the Sutter Energy Center photos indicates that under current CEC conditions of approval for night lighting of energy facilities, it can be expected that during hours of darkness that the walls of power plant structures will be softly illuminated and that in scattered locations, particularly in areas where there is external trusswork, individual light bulbs will appear to create glowing points of light. Review of the Sutter photographs also indicates that although the power plant structures will become visible elements in the nighttime landscape, the level of lighting will be muted, and the lighting is not likely to illuminate the nearby landscape or sky.

Summary of the potential extent to which night lighting during project operation would be visible from each KOP:

KOP 1 – From this viewpoint, the surfaces of the project's structures will appear in the middleground of the view as softly glowing structural elements accented with scattered points of light. Based on the experience at the Sutter Energy Center, it is reasonable to predict that the lighting is not likely to illuminate the surrounding landscape or sky. The illuminated project facilities will be seen in the context of the line of lighting along the State Route 74 corridor now visible in the far middleground of the view. Over time, as the project landscaping matures, views of the softly glowing walls of the HRSGs, tanks, and cooling tower will be screened, and only the upper portions of the illuminated stacks will be visible.

KOP 2 – From this viewpoint, the surfaces of the project's structures will appear in the middleground of the view as softly glowing structural elements accented with scattered points of light. Based on the experience at the Sutter Energy Center, it is reasonable to predict that the lighting is not likely to illuminate the surrounding landscape or sky. The illuminated project facilities will, to a large degree, block the view toward the line of illuminated features, including several softly glowing industrial structures, now visible along the State Route 74 corridor in the middleground of the view. Over time, as the project landscaping matures, views of the softly glowing walls of the HRSGs, tanks, and cooling tower will be screened, and only the upper portions of the illuminated stacks will be visible.

KOP 3 – From KOP 3, the surfaces of the project's structures will appear as a set of softly glowing structural elements clustered in the middleground in left half of the view. The glowing structures will be accented in places with individual points of light. Based on the experience at the Sutter Energy Center, it is reasonable to predict that the lighting is not likely to illuminate the surrounding landscape or sky. The nighttime visibility of project's lower structures will be screened to some degree by the vegetation and stored construction equipment in the view's far foreground. Over time, as the project landscaping matures, views of the softly glowing walls of the tanks, cooling tower, and most portions of the HRSG structure will be screened, and only the upper portions of the illuminated HRSG structures and stacks will be visible.

KOP 4 – From KOP 4, the surfaces of the project's stacks and one of the HRSG structures will be visible as a set of softly glowing structural elements accented with scattered points of light. The illuminated facilities will be clustered in the area behind the asphalt silos now seen in the center of the view. Based on the experience at the Sutter Energy Center, it is reasonable to predict that the lighting is not likely to illuminate the surrounding landscape or sky. The nighttime visibility of project's lower structures will be screened to some degree by

the walls, landscaping, and asphalt plant equipment in the near and mid foreground of the view. Over time, as the project landscaping matures, views of the softly glowing walls of most portions of the HRSG structure will be screened, and only the upper portions of the illuminated HRSG structures and stacks will be visible.

KOP 5 – From KOP 5, the surfaces of the project's switchyard equipment, HRSGs, combustion turbine air inlet filters, and stacks will be visible as softly glowing elements that occupy much of the middleground of this view. The glowing structures will be accented in places with individual points of light. Based on the experience at the Sutter Energy Center, it is reasonable to predict that the lighting is not likely to illuminate the surrounding landscape or sky. The project structures will block the view toward the line of security lights now visible in the corridor along McLaughlin Road in the far middleground of the view. The illuminated project structures will be seen in the context of the brightly lit billboard and mobile home sales lot located to the immediate left of the area captured in this view, and of the illuminated structure housing a small fabrication facility located to the immediate right of this view. Over time, as the project landscaping matures, views of the softly glowing energy center structures will be screened, and only the upper portions of the illuminated switchyard takeoff structure, HRSG structures and stacks will be visible.

KOP 6 – From KOP 6, the softly glowing surfaces of the small complex of low gas compressor station structures and equipment will be visible in the mid foreground of the view. Based on the experience at the Sutter Energy Center, it is reasonable to predict that the lighting is not likely to illuminate the surrounding landscape or sky. The nighttime visibility of project's lower structures will be screened to some degree by the wall that will surround the site. Over time, as the project landscaping matures, the illuminated structures and equipment will be entirely screened from view.

Request #146 - Please identify whether or not facility stack lighting would be required and if so, by which agency or requirement, and in what manner.

Response #146 - Stack lighting will not be required under the regulations of the Federal Aviation Administration. The Applicant will file FAA Form 7460-1.

Request #147 - Please describe night lighting to be used during project construction and lighting control measures to be employed during construction.

Response #147 - Because of the project's accelerated construction schedule, some of the construction activity will take place at night, which will require illumination that meets county, state, and federal worker safety regulations. To the extent possible, the nighttime construction lighting will be erected pointing toward the center of the construction site and will be shielded. Task specific construction lighting will be used to the extent practical while complying with worker safety regulations.

Request #148 - Please describe and map any other plume sources in the proposed project region.

Response #148 - Two separate visual surveys were conducted in the project region to identify the existence of visual plume sources.

Survey 1 was conducted on January 16, 2002 from 7:00 am to 9:00 am. The survey consisted of 360 degree visual sweeps of the project region. Weather conditions during the observation period were as follows; ambient temperature of approximately 60 deg F, winds from the

south-southeast, wind speeds 5-7 mph. Only one (1) plume was identified during the survey. The identified plume was from the existing asphalt batch plant located directly north of and adjacent to the plant site. The plume was essentially a water vapor plume from the venturi (water) scrubber on the asphalt plant stack. This plume persisted for approximately 150-250 feet downwind of the stack. The residual opacity of the stack upon water plume dissipation averaged 5-20%. Survey #1 was conducted by Foster Wheeler Environmental Staff (Richard B. Booth, Sr. Air Quality Scientist).

Survey 2 was conducted on January 28, 2002 during the morning hours. Ambient temperatures during the survey were approximately 40 deg F. This survey consisted of a drive-by around the site and immediate region. No plumes were identified in the project region during this survey. Survey #2 was conducted by CH2M Hill Staff (Thomas Priestly, Visual Resources Specialist).

Figure 148-1 shows the location of the one identified plume source per the visual surveys.

Request #149 - For both KOP 4 and KOP 5, please provide two additional visual simulations of the vegetative screening mitigation proposed for the SR 74 corridor. One simulation should show the landscaping at five years of growth. A second simulation should show the landscaping at maturity if greater than five years. For both the existing view image and simulations, please provide photocopies of high-resolution 11"x17" color images at life-size scale.

Response #149 - An objection to this request has been filed with the CEC. Notwithstanding the above, the following response is given for CEC review and consideration.

Close review of the existing infrastructure located along both sides of SR 74 in the vicinity of KOPs 4 and 5 and review of current plans for widening of the highway in this area has revealed that it would not be feasible for the Applicant to install landscaping within the existing public right of way in this area.

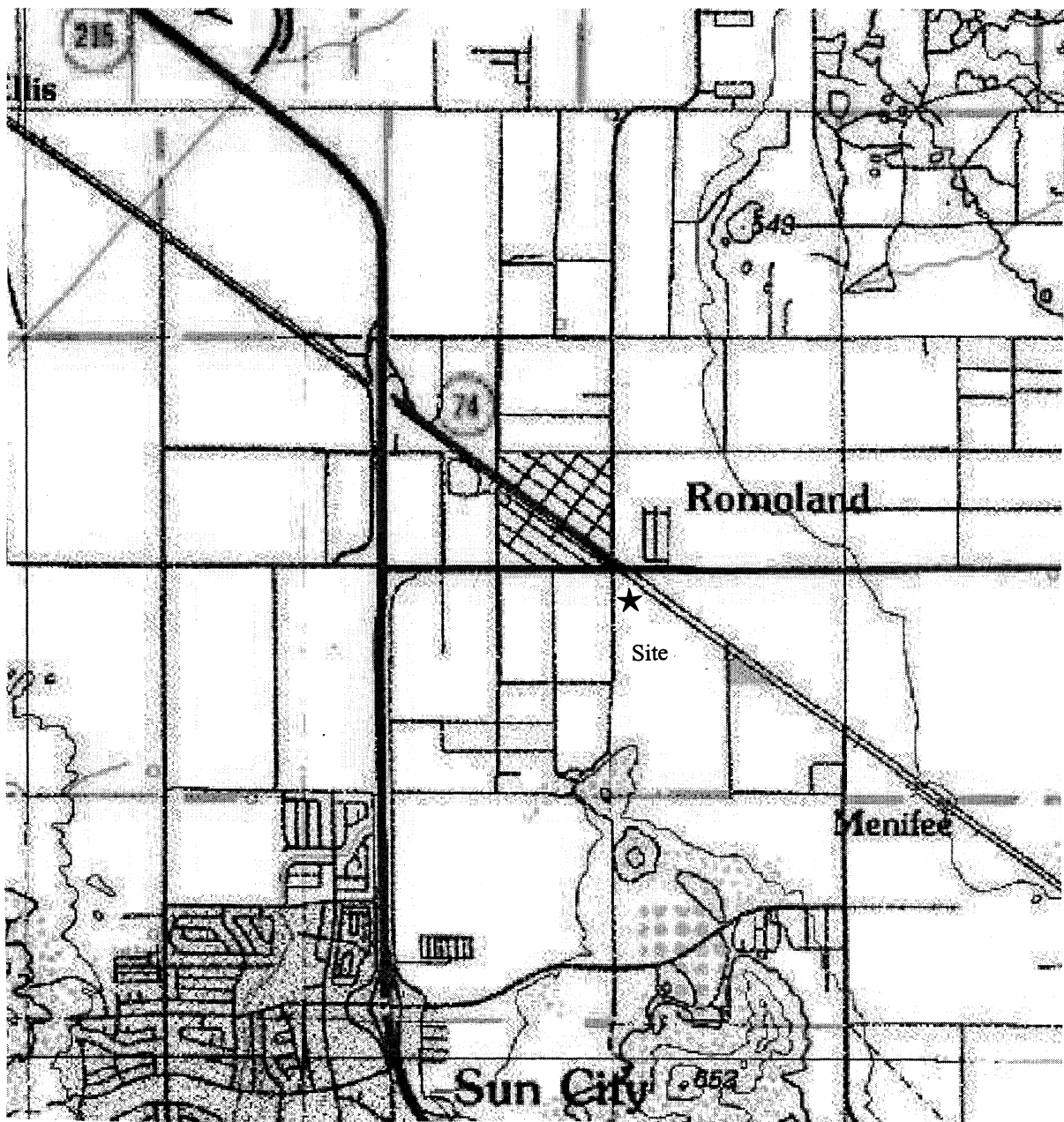
As an alternative measure to reduce the visibility of the project from KOPs 4 and 5, the Applicant is proposing a revision to the project landscape plan. Under the conceptual landscape plan that is reflected in the simulations presented in the AFC, the landscaping along the northern edge of the project was located around the northern perimeter of the 25-acre area in which the power plant facilities are to be located. The Applicant is now proposing to move the landscaping around the northern side of the site approximately 350 feet to the north, where it will be located along the northern and northeastern borders of the 45.8 acre property on which the project site is located. This shift in the landscaping location will bring it closer to KOPs 4 and 5, and because it will be closer to the viewers, it will be more effective in screening views toward the project from these areas.

A revised landscape plan is now being prepared, and it will be used as the basis for preparing new simulations of the views from KOPs 4 and 5. The revised landscape plan and simulation is projected to be filed with the Commission by March 13, 2002.

Request #150 - If the time to landscaping maturity is greater than five years, please specify the time to landscaping maturity.

Response #150 - See Response #149.

Request #151 - Please provide a conceptual plan that: (a) shows the location of the proposed screening vegetation along SR 74, (b) identifies the types of vegetation to be planted and the



★ Identified Plume/Sources

Inland Empire Energy Center
Inland Empire Energy Center, LLC

Figure 148-1
Identified Plume/Sources in Project Area

anticipated vegetation heights and five years and at maturity, and (c) the time to maturity for each species to be planted.

Response #151 - For (a), see Response #149. For (b), an objection relating to the 5-year significance has been filed with the CEC. Per the Applicant's notification of January 24, 2002, the projected filing date for the remainder of this response is March 13, 2002.

Request #152 - Please provide an additional setting photograph and simulations of the Highway 74 vegetative screening when viewing along SR 74. The viewing location should capture the trees on both the north and south sides of SR 74. One simulation should show the landscaping at five years of growth. A second simulation should show the landscaping at maturity if greater than five years. For both the existing view image and the simulations, please provide photocopies of high-resolution 11"x17" color images at life-size scale.

Response #152 - See Response #149. An objection relating to the visual simulation showing the landscaping at 5 years has been filed with the CEC.

Request #153 - Please identify whether or not Riverside County has commented on the proposed planting plan along SR 74, and if so, please indicated their comments and provide the contact information for the appropriate County contact(s).

Response #153 - See Response #149.

Request #154 - Please update Table 5.7-4 of the AFC to provide a list of all projects either under construction or approved for construction in the project vicinity.

Response #154 - See Response #66.

Request #155 - Please provide a map that shows the location of all cumulative projects identified in the previous data request.

Response #155 - See Response #67.

Request #156 - Please identify the appropriate local agency contact that can verify the cumulative project list and location.

Response #156 - See Response #68.

VISUAL RESOURCES, VISIBLE PLUME RESPONSES

Request #157 - Please identify the other combined cycle power plant projects that were reviewed to arrive at the assessment presented in Section 5.10.2.4 (AFC p. 5.10-23). For each of the other projects, please provide:

- the project name and location,
- the Energy Commission docket number,
- a description (e.g., heat rejection rate) of basic project components examined for visible plume effects,
- a description of plume temperature, mass flow, and moisture content for the other projects' components compared to the parameters for the IEEC cooling tower cells and HRSG stacks,
- a description of any operating strategies implemented to reduce potential visible plumes, and
- the size and frequency of the visible plumes predicted.

Response #157 - Rather than rely of the results of visible plume analyses performed for other power plant projects, a visible plume analysis was performed for the IEEC project. This analysis is included as Visual Attachment 1.

Request #158 - Please summarize, for the IEEC cooling tower, the conditions that affect vapor plume formation including exhaust temperature, exhaust mass flow rate, and moisture fraction by weight. These values should account for a range of ambient conditions that shows a reasonable worst-case operating scenario. For example, provide sufficient operating data to fill the following table. A range of ambient temperatures should be used as was in AFC Appendix K-3 for the turbines.

Parameter		Cooling Tower Exhausts		
Number of Cells		14 cells		
Cell Height		17.98 meters (each cell)		
Cell Diameter		11.35 meters (each cell)		
Ambient Temperature	@ 36°F	@ 61°F	@ 97°F	
Ambient Relative Humidity				
Heat Rejection (MMBtu/hr)				
Liquid/Gas Mass Flow Ratio				
Exhaust Temperature (°F)				
Exhaust Flow Rate (lb/hr)				
Molecular Weight (estd)		28.8 g/g-mol		
Moisture Content (% by wt) (if cells are plume-abated)				

Response #158 - Rather than rely of the results of visible plume analyses performed for other power plant projects, a visible plume analysis was performed for the IEEC project. This analysis is included as Visual Attachment 1.

Request #159 - Please note that staff intends to model the cooling tower using hourly estimated exhaust conditions based on the hourly ambient conditions of the meteorological file used to perform the modeling. The cooling tower exhaust conditions will be interpolated based on the exhaust values given. The Applicant may provide exhaust conditions for any range of ambient scenarios that is different from those above, as long as a similar range of conditions is reflected.

Response #159 - Comment noted.

Request #160 - Please summarize, for the HRSG stacks, the conditions that affect vapor plume formation including stack temperature, exhaust mass flow rate, and moisture fraction by weight. Also, please indicate if there would be any relationship between the use of duct burners and/or evaporative cooler with ambient conditions (i.e. note temperature/relative humidity conditions when either will not be operated). For example, provide sufficient operating data to fill the following table.

Parameter		HRSG Exhausts					
Number of Stacks		2 CTG/HRSGs					
Stack Height		59.44 meters (each stack)					
Stack Diameter		5.64 meters (each stack)					
Ambient Temperature		@ 36°F		@ 61°F		@ 97°F	
Ambient Relative Humidity							
Duct Burner	Off	On	Off	On	Off	On	
Exhaust Temperature (°F)							
Exhaust flow rate (lb/hr)							
Molecular Weight (estd)							
Moisture Content (% by wt)							

Response #160 - As discussed in the response to data request # 157, a visible plume analysis for the project was performed and is included as Visual Attachment 1. This analysis includes the information requested in this data request.

Request #161 - Please provide operational and performance data for any plume abatement strategies proposed by the Applicant for either the cooling tower or HRSG stacks.

Response #161 - No plume abatement strategies are being proposed for the project.

Visual Attachment 1
Visible Vapor Plume Analysis

Visible Plume Analysis

IEEC Project

The following is a description of the visible plume modeling performed for the IEEC Project. As discussed below, the visible plume modeling was performed for the new equipment (i.e., gas turbines and cooling tower).

Overview – Visible Plume Analysis

The basic principle used to analyze the visible water droplet plumes for the IEEC Project involves modeling the dilution of a water vapor plume as a function of wind speed, distance, and stability class from the release point, similar to the Gaussian approach for modeling gaseous pollutants. As the plume is diluted, the temperature of the plume approaches ambient temperature, and the moisture content of the plume approaches the moisture content of the surrounding ambient air. At any given point along the plume, one can use the dilution factors to determine the plume temperature and moisture content, given knowledge of the temperature and moisture content of the plume at the time it leaves the release point, and of the temperature and moisture content of the ambient air. Knowing the temperature and moisture content of the plume at that point enables one to determine whether the moisture will condense at that point to form a visible water plume. By performing these calculations along a series of points, one can determine whether a visible plume will form and, if so, the length of the visible plume for each hour evaluated.

The modeling system includes the following components:

- A modified version of the Industrial Source Complex Short Term Model Version 3 (ISCST98356) is used to determine plume dilution through the evaluation of water droplet concentrations determined along a series of receptors placed along the plume centerline. These calculations are performed for each hour of the year using a standard modeling meteorological data set.
- A second module, CLAUSIUS, determines the amount of dilution of the plume that is required for the visible plume to evaporate.
- A third module, DISTANCE, determines the distance (along the plume centerline) that the plume is visible.
- A fourth module, COUNT, summarizes the statistics and prints a report.

Each of these components is discussed in more detail below.

ISCST3 was modified to provide for the determination of pollutant concentrations along the centerline of a plume. The centerline of the plume is represented by flagpole receptors along a single radial from the stack. The model produces an output file, which includes concentrations for each receptor along the radial for each hour of the year. Relative to the concentration present in the stack, the concentrations reported at each receptor represent the degree of dilution of the plume with ambient air at that point. The modified version of ISCST3 has the following features:

- Calculations can be performed for up to 100 receptors placed along the centerline of the plume.
- Default ISCST3 features that prevent calculations of pollutant concentrations at locations close to the emission source have been disabled.
- To avoid ignoring meteorological conditions where visible plumes are likely to be formed, wind speeds of less than 1.0 m/s are set to a wind speed of 1.0 m/s, to avoid implementing the calms processing feature of ISCST3.
- Concentrations are calculated regardless of whether the plume height lies above or below the mixing height.
- Calculations are performed for only simple terrain.
- Calculations are performed for only a single source.

Meteorological data from the Riverside monitoring station for the 1981 calendar year, obtained from the South Coast AQMD, were used for the plume visibility analysis. Relative humidity data from the March AFB for the 1981 calendar year were also used for the analysis.

CLAUSIUS

The CLAUSIUS module uses a linear interpolation of water vapor pressure, between the stack exit and ambient conditions, together with the Goff-Gratch formulation of the Clausius-Clapeyron equation for water vapor, to determine the amount of dilution required for the visible plume to not be visible. These calculations are performed for each hour of the year, using the same meteorological data set used for the ISCST3 dispersion modeling analysis. The CLAUSIUS program can perform calculations for various types of sources:

- Sources with a fixed exit temperature
- Sources with exit temperatures at a constant increment above ambient temperatures
- Sources with a fixed moisture content
- Sources where moisture content is a function of ambient temperature
- Sources with a moisture content fixed at a specified relative humidity, given an ambient temperature
- Sources with diurnal cycles of temperature and water content

In this regard, the modeling system can be somewhat more versatile than other models typically used to evaluate visible water plumes, such as SACTIP (Seasonal/Annual Cooling Tower Impact Program), since combustion sources as well as cooling towers can be treated.

DISTANCE

The DISTANCE module uses the resulting output from ISCST3 and CLAUSIUS to determine the distance along the centerline of the plume where sufficient dilution has occurred such that the plume is no longer visible.

COUNT

The COUNT module summarizes and prints the statistics regarding plume visibility. Available statistical outputs include the number and frequency of hours in which a plume is visible, separately for daytime and nighttime conditions, as well as a frequency distribution of visible plume lengths. The day/night boundary is treated as sunrise/sunset, calculated for every day of the year.

Assumptions

The following exhaust characteristics were derived from data provided by the project's design engineering firm, and reflect worst-case conditions. Please note that for the new turbines, the full load operation case results in high moisture content in the exhaust gas for the new turbine due to the use of a 700 MMBtu/hr duct burner.

Exhaust Characteristics For New Equipment IEEC Project	
New HRSG Stack (full load operation) With Duct Burner For Hours 13 to 22	
Stack gas exit temperature	331 deg. K
Stack diameter	5.64 M
Stack gas exit velocity	17.04 m/s
Stack gas moisture content	10.92 % vol.
Stack gas mass flow	3,497,776 lbs/hr
Stack gas average molecular weight	28.15 lbs/lb-mol (wet)
New HRSG Stack (full load operation) Without Duct Burner For Hours 1 to 12 and Hours 23 to 24	
Stack gas exit temperature	346 deg. K
Stack diameter	5.64 M
Stack gas exit velocity	17.56 m/s
Stack gas moisture content	8.14% vol.
Stack gas mass flow	3,467,208 lbs/hr
Stack gas average molecular weight	28.32 lbs/lb-mol (wet)
New Cooling Tower	
Stack gas exit temperature	293.2 deg. K
Stack diameter	11.3 M
Stack gas exit velocity	8.05 m/s
Stack gas moisture content	100% RH

Interpretation of Results

The water droplet plume visibility analysis is an approximation technique, which should not be used to establish limiting conditions for the operation of a facility or a particular piece of equipment. The following caveats should be observed in interpreting the model results:

- Meteorological conditions reflecting low mixing heights may not necessarily be properly modeled. Little data are available regarding temperatures and relative humidity levels above the mixing height at any particular location and the plume is no longer in a well-mixed surface layer.
- The model is least reliable at predicting plume visibility under calm nighttime conditions, since both temperature and relative humidity vary strongly with height under those conditions. What is measured at the meteorological station (at a height of 10 meters) may vary considerably from actual conditions at plume height. In general, under cold, nighttime conditions (with shallow radiation inversions), temperatures are likely to be colder, and relative humidity higher, at the height of the meteorological monitor than at plume height, thus resulting in an overstatement of plume visibility during these conditions.
- Latent heat release and absorption are not treated in the modeling system. These effects are likely to be of secondary importance for combustion plumes traveling for relatively short distances, but may play a more important role for cooling tower plumes. Condensation of water droplets in the plume will cause the plume to increase in temperature, while evaporation of those droplets will subsequently cool the plume by a similar amount. These effects are likely to be negligible in the case of combustion sources, where the plume temperature is already 100°F (or more) warmer than the surrounding ambient air. The effect of ignoring latent heat release and absorption is to slightly underestimate initial plume rise, and slightly underestimate plume length.
- The model results are extremely sensitive to assumptions regarding ambient and stack gas moisture content and relative humidity (as is actual plume visibility). Furthermore, it is not clear that the accuracy of the relative humidity monitors is suitable for the use to which the data are being applied.

Modeling Results

The following table summarizes the hour-by-hour modeling results. Copies of the modeling input and output files used for this analysis are included in the air quality modeling CD that was submitted to the CEC for this project.

Visible Plume Modeling Results Visible Plume During Daylight Hours (nonrain/nonfog hours) IEEC Project		
	New Turbines, Full Load, Duct Burner	New Cooling Tower
Number of Hours with visible plume	464	377
Average Plume Height (meters)	175	101
Average Plume Diameter (meters)	80	44
90 th Percentile (height) Plume Height (meters)	235	115
90 th Percentile (height) Plume Average Plume Length (meters)	163	42
90 th Percentile (height) Plume Average Plume Diameter (meters)	108	50